

Varia

#1

In Inaugural Essay.
On the Absorbents.
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A function perhaps in the animal economy,
is involved in greater obscurity, than that per-
formed by the absorbents. Owing to the generally
collapsed state of these vessels in the dead body,
and the extreme secrecy with which they fu-
lfill their office, they were for a long time entire-
ly unobserved, and the phenomena which are now
cribed to them were either unknown, or suppos-
ed to be the production of the venous system. The
live decomposition and renovation of the animal
body, has now generally if not universally belie-

ed, was a fact never dreamt of by the ancient. Their ideas of absorption were confined entirely to the different fluids both within and without the body, and which constitute no part of the living system.

By the labours however of more modern anatomists a distinct species of vessels has been discovered, and operations of a more important nature than formerly conjectured are found to be carried on the animal body.

Eustachius a Roman anatomist is considered by some as entitled to the honor of having, tho accidentally, led the way in those researches, which have terminated in the present improved state of the branch of anatomy as well as physiology. In the year 1563 when engaged in the dissection of a boar he observed what is now known to be the principal trunk of the absorbent system. Not being able to even to form any idea of its use, his discovery was immediately followed by any very important sequencies.

No further progress was made in this investigation

until the year 1622, when Asellius another
Italian anatomist by chance discovered the lac-
teals in a living dog, while occupied in observing
the motion of its diaphragm. He not only pro-
ved their existence, but, what was equally import-
ant, suggested their purpose. This discovery he
extended and confirmed by examining animals
of various species, and by analogy which is now
known to be just, he inferred their existence in
man.

This may be considered as a truly important
epoch in history of anatomy. A species of org-
ans hitherto unknown, but of the highest im-
portance in the Animal Economy, burst upon
the sight and give to physiology a new form.
The attention which novelty ever attracts was
not wanting to the present discovery. Numerous
were those who enlisted themselves on both sides
of the question, some laboring with the warm-
est zeal in its support, others endeavoring to

prevent an innovation likely to undermine systems of the longest standing and most engrafted belief. From this period I shall not attempt to pursue the history of these vessels with any degree of minuteness, but endeavour here to give the result of those discoveries which have at different times been made by various anatomists.

The conjecture of Sullivans respecting the existence of lacteals in the human body has been fully established by subsequent dissections; and in addition to these, other vessels have been discovered, differing only in their situation and the fluids which they generally convey, and distinguished by the name of lymphatics. The lymphatics were first supposed to be specifically different; are now considered as only another branch of the same system with the lacteals, and as constituting with them an entire and distinct species of vessels under the name of absorbents.

After the existence of a new set of vessels was es-

established, it then became a subject of contest whether they really performed the office from which they derived their name, and whether they were exclusively employed, or derived assistance in their operations from the venous system. It would be useless to dwell upon the proofs of opinions that are now universally admitted. That the lacteals absorb has been demonstrated by repeated experiment, and the absorption of the lymphatics, tho' perhaps not susceptible of decision by experiment, equally unexceptionable as those by which the absorption of the lacteals was determined, is nevertheless founded upon facts which render it equally certain, and exclude even the possibility of doubt. Perhaps the most unequivocal proof of lymphatic absorption, is that which is derived from those vessels continuing to receive and transmit their fluids after the other parts of the body have become inactive, and have ceased to exhibit the signs of life.

The question still remains whether these vessels are the only absorbers in the body, or whether the veins participate in that action. That the lymphatics, by which term I comprehend the whole absorber system, are the exclusive agents in absorption, would seem to be probable from several considerations, first, from the simplicity of nature, who never employs for the execution of any purpose more instruments than are absolutely necessary; secondly, from the apparent incapacity of the veins for that office; and thirdly, they do absorb, from their having in no instance been incontestably detected in that action.

The veins appear to be deficient in that contractile power which is necessary in absorbers, in order to propel their fluids into the general circulation. Godbyce denies the possibility of venous absorption upon the principles of hydraulics, his words are these, "In a living animal where the veins are contracting and pressing the blood, if one end of a capillary tube terminate in a vein and the other in a cavity, and if there be no action in that tube, a

ce which
whether the
lymphatic
secretions
are from the
frontal
tissues, or the
apparatus
of the heart,
contracted
to, in order
to circulate
the blood
in the veins
and open
the skin
at tube
emptying that which arises from it being a capillary
one; or from the motion of the blood in the vein; if
there be any motion in that tube after it is full,
it will always be from the vein into the cavity and
never from the cavity into the vein, let the tube
be of any size or shape whatever. Now the veins
being allowed to possess little if any thing more
than elasticity, would be precisely upon the same
footing with a capillary tube.

Those experiments which proved absorption by the
tissues would appear to be equally decisive
against venous absorption, unless we allow par-
ticular parts out of the venous system to be en-
dowed with this power.

The only places in which it has been main-
tained with any degree of probability, that the veins
absorb, are the placenta, the lungs and corpora
cavernosa penis, where they are said to arise by
open mouthed. Blumenbach and Charles Bell
say expressly that venous absorption does obtain in
the skin.

that instances Cruikshank allows that the veins
arise here by open mouths and that the blood enters
into them from the cells in which it has been depar-
ed, and混bles with the column of blood in the cir-
culation. Oposed however to the doctrine of absorp-
tion by the veins in general, he was unwilling to
admit it in any instance, and tells us that he was
once in the habit of explaining this fact upon the
principle of a vis a tergo, and to view it in the light no
t of a circulation than absorption of the blood. In the
same manner that Harvey explained the pas-
sage of the blood from the arteries into the veins
any part of the body; which he ascribed to the pu-
lusive force of the ^{heart} ~~sorrows~~ during the blood not only
thus the parenchymatous substance which he sup-
posed to form a medium of communication between
these vessels, but also into the incipient radicles of the
veins. But Mr. Cruikshank afterwards relinquish-
ed this explanation as unsatisfactory, observing that
the cells of the supposed parenchymatous substance
of the placenta &c were not traceable at the time of their

apparent venous absorption, which they ought to be, to render the explanation satisfactory? He does not appear however to have changed his sentiments upon the subject of absorption, as this he acknowledged his inability to ^{explain} his seeming objection to the theory which he had espoused; but rather, with Tordayce, who for the reasons already mentioned, denied the possibility of venous absorption, to have restricted it among the number of those facts which are not yet perfectly comprehended, and which are to be elucidated by future discoveries. The opinion which considers the lymphatic system as exclusively employed in the operation of absorption, derives considerable additional weight from the authority of the Professor of Anatomy in the University of Philadelphia. We are next to consider the manner in which this operation is performed. No subject perhaps has afforded more ground for speculation than the present. While certainty is unattainable, the imagination conceals itself privileged to indulge in all the wildness of conjecture.

By some of the earliest theorists upon this subject the absorbents were considered nearly in the light of inanimate tubes, and the solutions which were proposed of their phenomena, were purely physical. According to one which is mentioned by Cuvier, the lymph which was supposed to rush into the absorbents, in consequence of vacuums which were continually forming in the thoracic duct by means of its constrictions upon its contents. In order to render this conceivable it would seem necessary that the absorbents be in a state of continual distension, for if ever they become collapsed, there is upon the supposition we are now considering no means by which they can again be dilated. There will then be no vacuum to be occupied, and unless they have the power of filling themselves, they will forever remain empty. But it is well known that the absorbents have at different times ^{different times etc} different degrees of distension and occasionally collapsed. There are other objections to the opinion, such as the infinite number of lymphatic glands, the presence of the diaphragm which would afford frequent interruptions to the effect of

subject vacuum in the thoracic duct upon the mouths of the absorbents.
I think of inc-
reased absorption to begin in the extremi-
ties of the vessels simply upon the principle of capil-
lary attraction. To this opinion, as Comiteshank ob-
serves, there appear to be several objections. He is
inclined to think that there was something like a
power of selection in the surfaces of the absorbents, which
enabled them to receive or reject different matters,
according to the manner in which they were affected
by them. This idea of a discriminative power was
founded upon the fact of the absorbents being in some
instances immersed for a considerable time in a
fluid without taking up any portion of it. An exam-
ple of this he mentions to have witnessed in the ori-
fices of the trachea on the intestines, where some of
the cells were filled with chyle, and others again in
their immediate neighbourhood were perfectly emp-
ty. Now this as he observes could not have been the
case, if their taking up the fluid had depended
solely upon the principle of capillary attraction, as
this principle must operate uniformly and without

interruption, and under the same circumstances must always exhibit the same phenomena. Mr. Compte does not however seem to have entirely rejected the agency of capillary attraction in the commencement of absorption or in the entrance of the fluids into the mouths of the absorbents. His words are thus; "The liquid to be absorbed affects the mouth of the absorbent, and determines it to give admission or not. If it gives it admission, the first part of the lymphatic absorbs it, perhaps as has been supposed, by its action as a capillary tube." Richardson expresses in different words nearly the same opinion with that which has just been mentioned. He as well as Crutchshank ascribes to the orifices of the absorbents a peculiar sensibility and a power of rejecting or receiving the fluid applied to them. The modifications of which this function is susceptible from a variety of circumstances, as age, sex, temperament &c he considers as affording an unanswerable objection to the opinion of its depending solely upon physical

principle, the operations of which are always to be distinguished from those of the living system, by their uniformity and want of intermission. I am not sure whether Richardson allows capillary attraction to be at all concerned in the phenomenon of absorption, but I am myself disposed to adopt the opinion which supposes this function to result from the operation both of a vital and physical principle. It seems not improbable that the act of taking up their contents is similar to that of capillary tubes, but that their being in a state of preparation to perform this action depends upon the exertion of a living power. "Each lymphatic absorbent," says Richardson, "when disposed for absorption, erects, draws with it the surrounding membranous parts, and thus forms a small tubercle, analogous to the *puncta lacrymalia*." When in this state I suppose the lymph to enter them exactly in the same manner as so many capillary tubes, but in opening this state they want a living power. With respect to the peculiar sensibility or power of

selection which is ascribed to these vesps, there appears to be no evidence so indisputable as force conviction, or to render it impossible to entertain a doubt upon the subject. It would appear not very easy to explain why the same liquid should be taken up by some of the absorbent and rejected by others upon the principle of a power of selection. If they really had such a power would it not in all probability be exerted in favor of but comparatively a small number of substances and those of an innocent nature? The principal object of such a discrimination between the articles received would certainly be to guard against the introduction of noxious substances into the system. That this object is not attained is sufficiently evident from the dreadful effects which too frequently present themselves, occasioned by the absorption of substances destructive not only to the vesps which take them up, but to the whole body. There is also much reason to suppose that the vesps which take up the venenos, the venenol and other poisonous matters we-

not receive any substance whatever when reduced to a state of sufficient torpor to enter their offices. There appears to be little reason to consider the sympathies as exempt from the laws which regulate muscular action in general. It is natural to suppose that they like any other part of the living system, require intervals of rest, and that every undue or long continued exertion of their power is followed by a state of torpor or indisposition to its renewal. Will not this view of the subject enable us to account for the fact mentioned by Cruikshank, without the necessity of leaving the animal in a position of susceptibility or power of selection in the absorbent, which seems to be opposed by many considerations. Well may it be asked, "why should the absorbent possess such a power, with so little discretion in the exercise of it?" I should feel it incumbent on myself to offer some apology for inferring

an opinion in opposition to such high authority as that
which has been mentioned, did I not know that in
doing so, I have the sanction of authority at least equal,
and in my own opinion far superior.

In the very cursory remarks which I have made upon
the absorbents, I am aware that I have noticed but a
part of the operations which are ascribed to them. They
are said to be perpetually taking down the different parts
of the body as fast as they are formed by the arteries; and
that thus by the action of the two systems, the body is
as it were always in a state of fluctuation or in other
words is constantly undergoing the operation
reparing.

That some of the solid parts of the body at par-
ticular periods of life and in certain cases of disease
are removed, there can be no doubt. But it is still
a subject of question whether they are not decompo-
sed previous to their absorption. "The solids" says Dr.
Haller, "are raised by the agency of the vessels on the chemi-
cal affinities of the circulating fluids. They are

be resolved by their decomposition, reducing them again to the state of fluids; or the vesicles throw out fluids which dissolve them; an operation anterior to their absorption." And says Richardson "It should not be forgotten that organized living matter internally agitated by a double motion, compounds and decomposes itself continually." At this perhaps we are not able to explain how this decomposition is effected, yet the apparent insusceptibility that solid substances as muscles, tendons &c. should be removed by such instruments as the absorbent vesicles, without first undergoing a change in their texture, would seem to afford sufficient reason for believing that such a change does take place. Putting the question out of the question, is it perfectly certain, that every part of the body does undergo the perpetual revolution which has been already mentioned? That there is no part of the body which may not occasionally experience a change in the particles of which it is composed, in consequence of accident or disease I can readily conceive, but I must confess that

I am not able to discover any reason why an animal
frame any more than a wooden one which is per-
petually undergoing a change in the materials
of which it is composed, should experience the rav-
ages of time, or why an animal which may be con-
sidered as regenerated every eight or ten years shou-
ld ever die of longevity.